



National Security Workforce: Challenges and Solutions



A National Issue

- **“An Emerging and Critical Problem of the Science and Engineering Workforce”¹**
 - 12 Major studies (1999-2004) make essentially the same point
 - A few studies did not consider security clearance needs and rely on relaxation of immigration rules
- **Growing need for U.S. citizens in national security activities**

1. National Science Board Companion Paper to “National Science and Engineering Indicators 2004”, National Science Foundation, April 2004

The Many Scientist & Engineering (S&E) Workforce “Storm Warnings” Have Gone Unheeded



- **Hart-Rudman Commission on 21st Century National Security (1999-2001) recommended “a new National Security Science and Technology Education Act”**
- **President’s Council of Advisors on Science & Technology (October 2002) recommended “a major program of fellowships should be established to attract and support advanced graduate studies of U.S. citizens in fields of science and engineering that support critical national needs”**

S&E Workforce “Storm Warnings” (continued)



- **President’s Commission of the Future of the U.S. Aerospace Industry (November 2002):**
“...actions and investments should include scholarships and internship programs to encourage more U.S. students to study and work in mathematics, science and engineering fields. In addition, investments should be made in vocational education...”
- **NSF National Science Board (August 2003)**
recommended a National Policy Imperative to ensure the adequacy of U.S. S&E workforce

S&E Workforce “Storm Warnings” (continued)



- **The Quiet Crisis: Falling Short in Producing American Scientific & Technical Talent (“BEST” April 2004) recommended that the Federal Government “... consider a bold initiative similar to the National Defense Education Act of 1958”**
- **The S&E Workforce and National Security (NDU, April 2004): “The federal government should enunciate a clear policy of sustaining long-term research as an inducement to young people to enter careers in S&E.”**



S&E Workforce Needs Can be Met

- **Studies that conclude, “All will be well.”**
 - **RAND Report (Sept. 2003)**
 - **Alfred P. Sloan Foundation (Teitelbaum)**
- **Their conclusion presumes relaxation of immigration quotas and temporary visa requirements to sustain U.S. S&E**
- **Neither addresses the need for security cleared personnel (i.e., U.S. citizens) in U.S. national security and defense sectors**

Final Report of the Commission on the Future of the United States Aerospace Industry

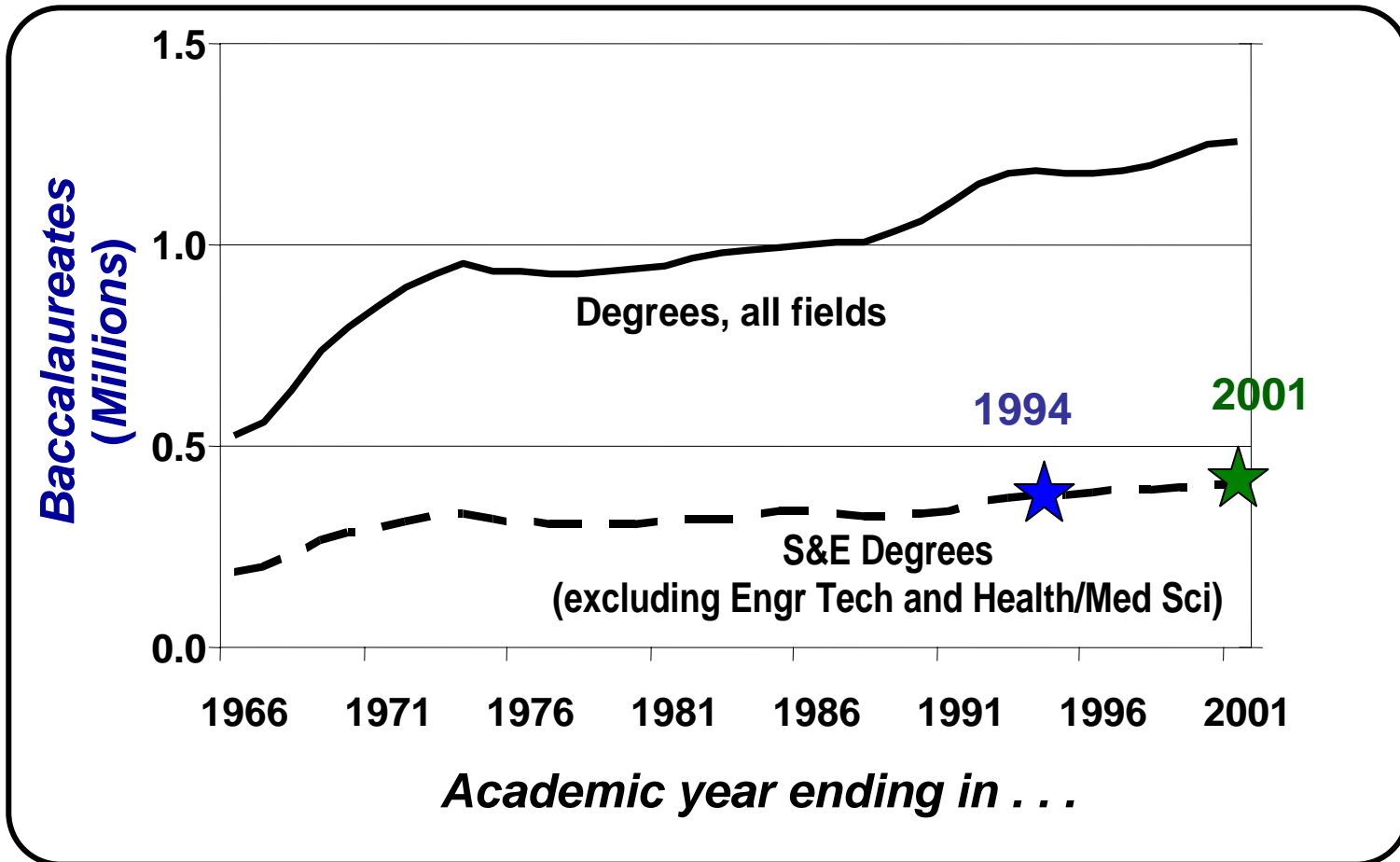


- **Summary of findings from final report, "Anyone, Anything, Anywhere, Anytime" (NOV 2002)**
 - The United States boldly pioneer new frontiers in aerospace technology, commerce, and exploration.
 - Transformation of the U.S. air transportation system be a national priority.
 - The United States create a space imperative.
 - The nation adopt a policy that invigorates and sustains the aerospace industrial base.
 - The federal government establish a national aerospace policy and promote aerospace by creating a government-wide management structure.
 - U.S. and multilateral regulations and policies be reformed to enable the movement of products and capital across international borders on a fully competitive basis and establish a level playing field for U.S. industry in the global marketplace.
 - A new business model be designed to promote a healthy and growing U.S. aerospace industry.
 - The nation immediately reverse the decline in and promote the growth of a scientifically and technologically trained U.S. aerospace workforce.
 - The federal government significantly increase its investment in basic aerospace research in order to enhance U.S. national security, enable breakthrough capabilities, and foster an efficient, secure, and safe aerospace transportation system.

U.S. Production of S&E Graduates*



U.S. College and University Graduates, 1966-2001



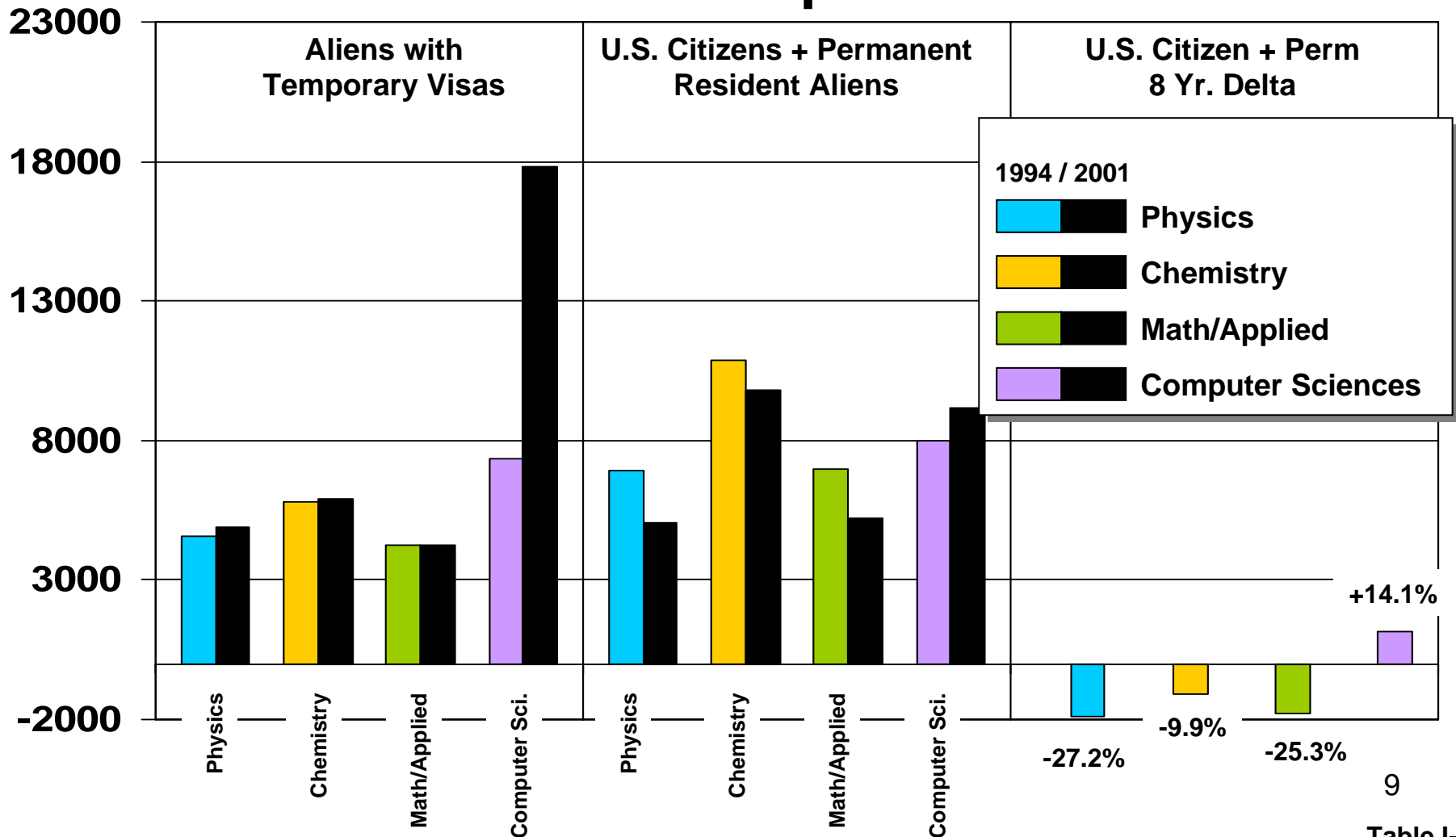
*Source: Data provided by the NSF, September 2003

U.S. University Trends in Defense-Related S&E Graduate Student Enrollment (1994-2001)



*Source: National Science Foundation – Graduate Students and Post Doctorates in Science and Engineering: Fall 2001

Science Disciplines

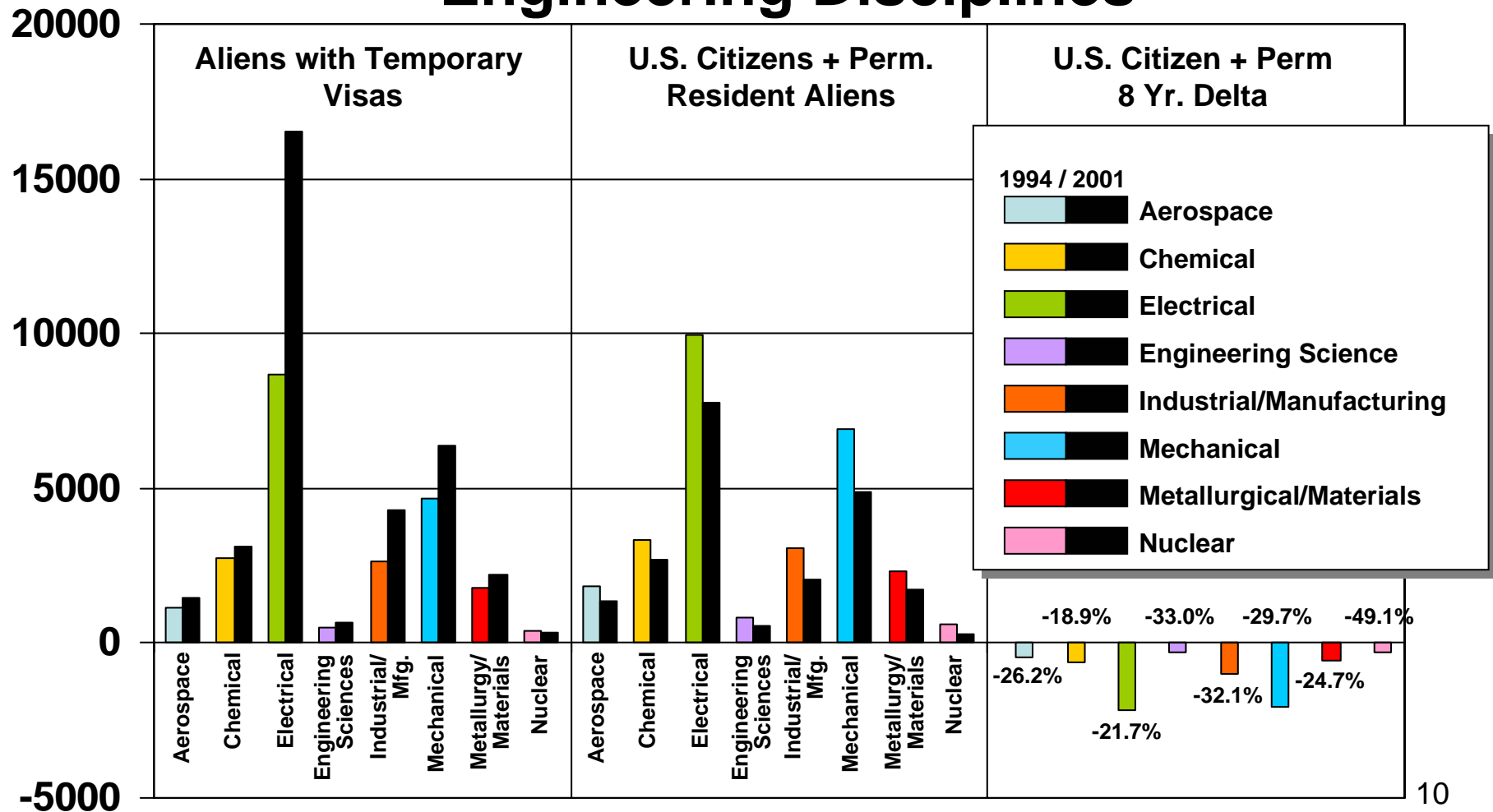


U.S. University Trends in Defense-Related S&E Graduate Student Enrollment (1994-2001)



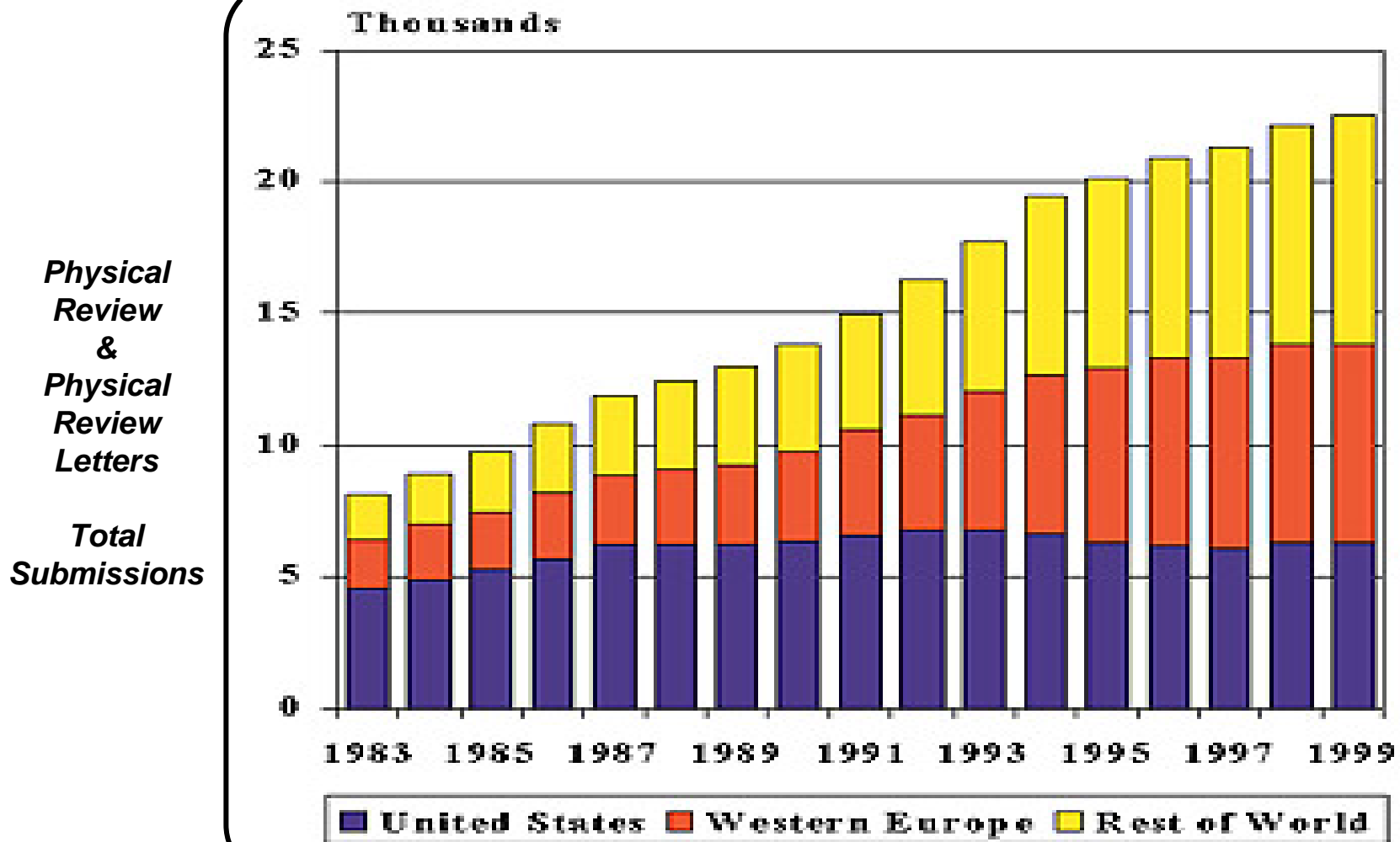
*Source: National Science Foundation – Graduate Students and Post Doctorates in Science and Engineering: Fall 2001

Engineering Disciplines





Physical Review Trends



Source: American Physical Society - APS News August/September 2000

DoD Scientists & Engineers (S&E)



- “Attrition” in DoD labs: ~13,000 Science, Math, Engineering and Technology (SMET) departures projected within 10 years
- The number of clearable students pursuing defense-related critical skills degrees is declining
- Projected U.S. demand for S&E’s will be up 10% by 2010 (Bureau of Labor Statistics 2001)
 - DoD will have tough competition for best S&Es
 - Linguist needs in Science & Technology (S&T) also beneficial

SMART – FY05 Congressional Act

(Science, Mathematics and Research for Transformation)



- **\$2.5M Appropriated in FY05**
- **Authorization Language**
 - **SecDef “shall carry out a pilot program”**
 - **For SMET skills and disciplines critical to national defense**
 - **Begin Oct 1, 2004**
 - **Scholarships for US Citizens (undergrad or advanced degrees)**
 - **Service Agreement / Payback required to DoD not less than 1 to 1.**

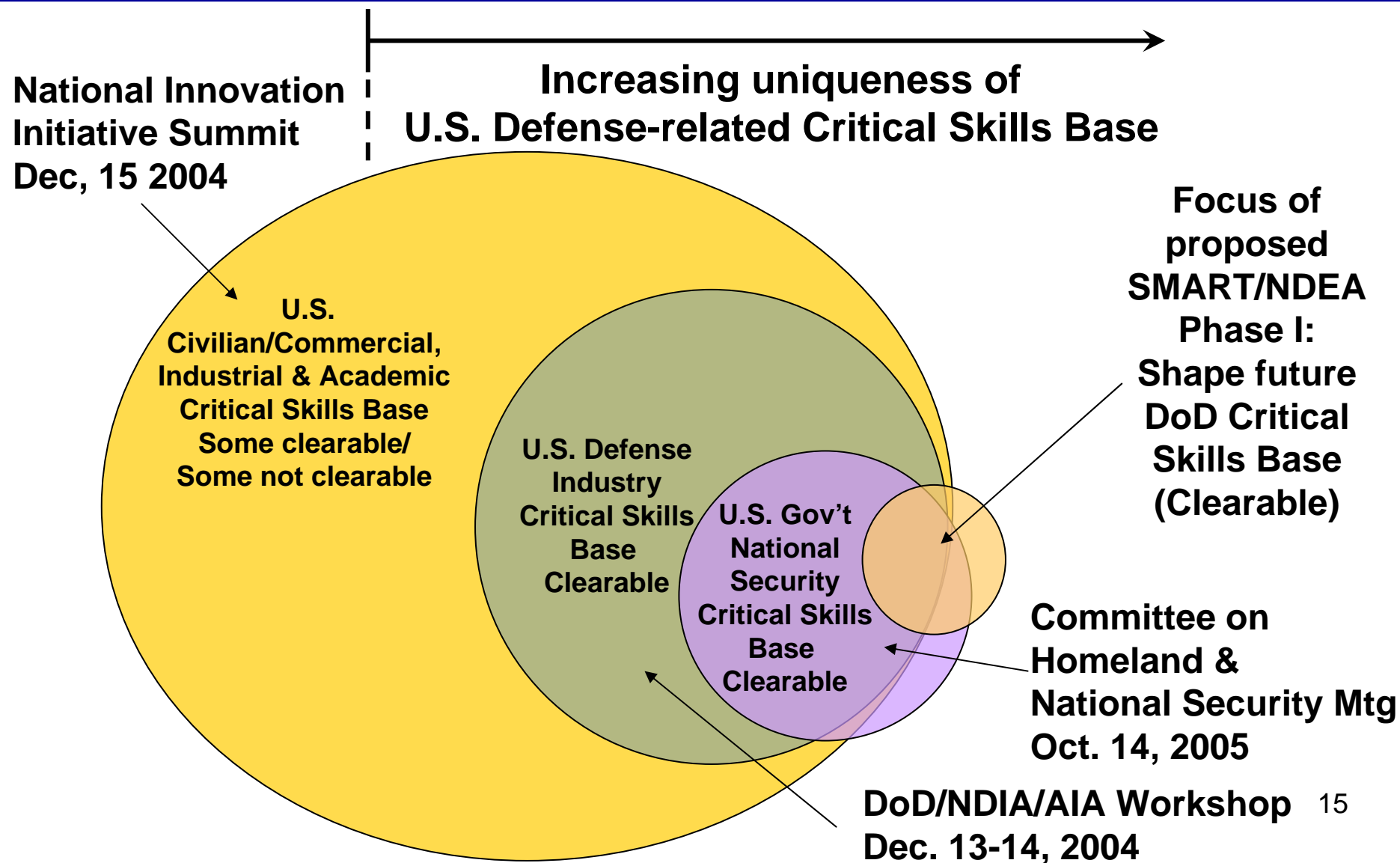


Recent DoD Activities

- **Implementing Science Mathematics and Research for Transformation (SMART)**
 - FY05 Congressional Add
 - Concept of Operations & Broad Agency Announcement in coordination (announcement anticipated soon)
- **SMART/National Defense Education Act (NDEA) Phase I**
 - Proposed for FY06
 - Phase I program details in active coordination
- **Future actions**
 - Establish mechanism to refine critical skills & disciplines needs
 - Improve reporting of ongoing programs
 - Track Science, Mathematics, and Engineering (SME) participants

Initial DoD Critical Skills Focus

Proposed SMART/NDEA Phase 1 Relative to Other U.S. Sectors





Defense Industry Perspective



Quick-Look Presentation
August 31, 2004



Report on
Aerospace Workforce
March 26, 2004

- **Industry Demand Data**
 - Survey responses highly indicative of a high demand/low supply market place with future negative trends for US Citizens
- **Workforce Demand Thematic**
 - Perfect Storm Analogy is real – not just anecdotal
 - Focused on cleared and clearable engineers
- **Employment Considerations**
 - Priming the pump is only first step – effective utilization and retention are critical!
- Immediately reverse the decline in scientifically and technologically trained US workforce...
- America's breakdown of intellectual and industrial capacity threatens national security and our capability to continue as a world leader
- Substantive, long-term US Gov. investment in SME education and training at the undergraduate and graduate levels

National Security Workforce: Challenges and Solutions Workshop



Expected Outcomes:

- **Collaborate on challenges and solutions to those challenges**
- **Identify new ideas for creative and innovative ways to solve these tough problems**
- **Create an action plan for the future**
- **Identify Barriers**
- **Identify Specific Discipline Pool of “Critical Needs”**
- **Recommend Schedule of Action Steps for:**
 - **Government**
 - **Industry**
 - **Academia**



Two-Pronged Implementation Approach

Technical Needs

- **Legislation**
 - **Seek Broad / Flexible Authority**
 - **Critical Skills**
 - **Scalable**
 - **Service Agreement / Payback**
 - **Consider “GI Bill-type” option**

- **Proposed FY06 Budget**
 - **Conservative**
 - **Proposed FYDP Funding Profile**
 - **Science and Engineering**
 - **Linguists (NSA, DIA)**

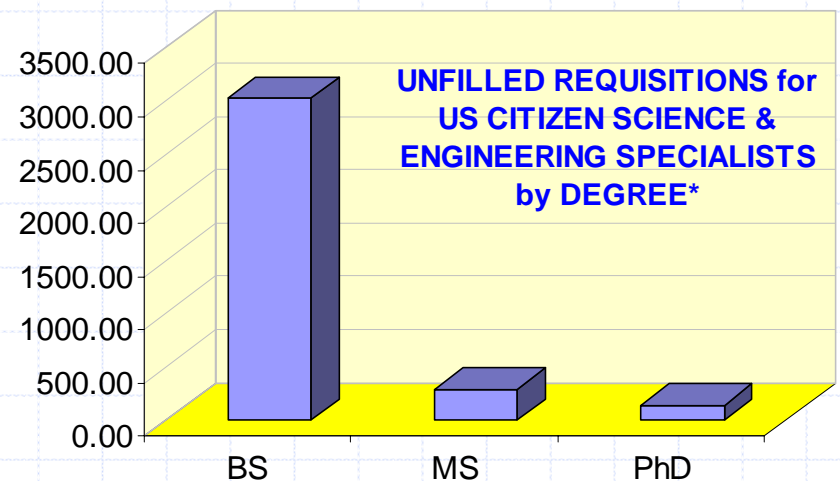
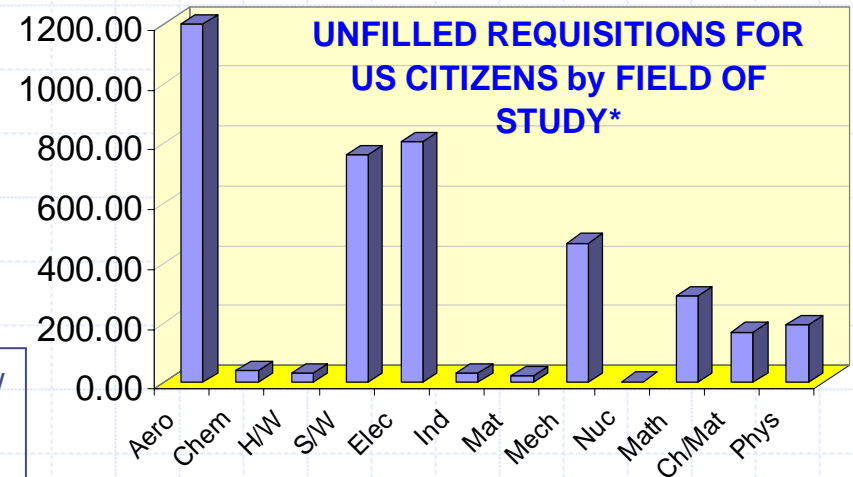
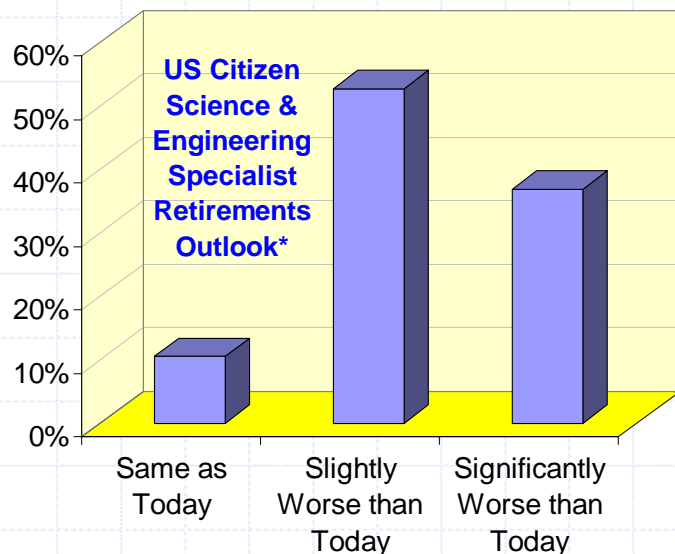


STRENGTH THROUGH INDUSTRY & TECHNOLOGY

Industry Demand Data

- ◆ Overwhelming consensus
- ◆ Thousands of unfilled science & engineering positions for US citizens
- ◆ Getting worse

*-NDIA Quick Look Survey
-Small random sample
-Spring 2004 data only

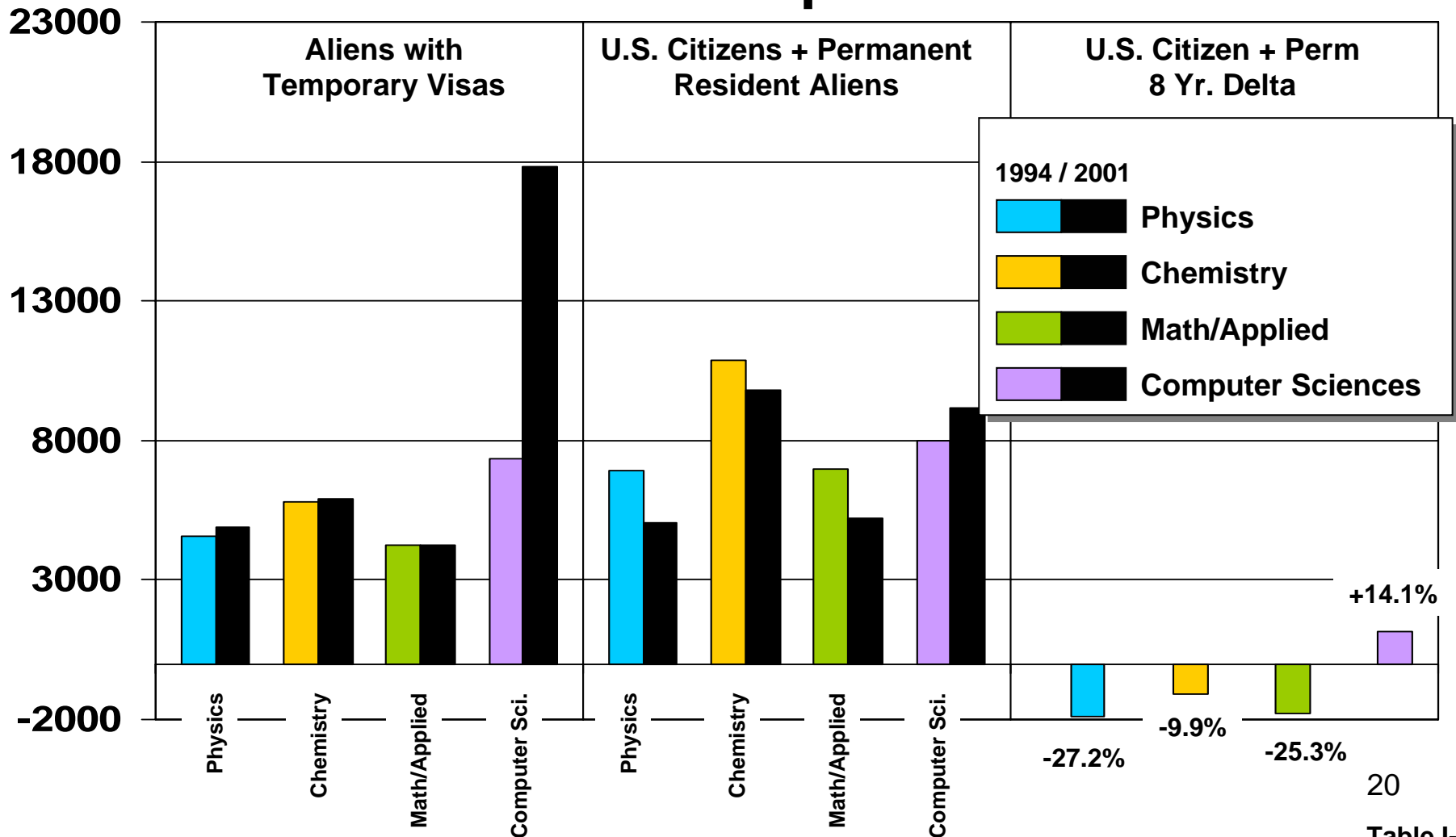


U.S. University Trends in Defense-Related S&E Graduate Student Enrollment (1994-2001)



*Source: National Science Foundation – Graduate Students and Post Doctorates in Science and Engineering: Fall 2001

Science Disciplines

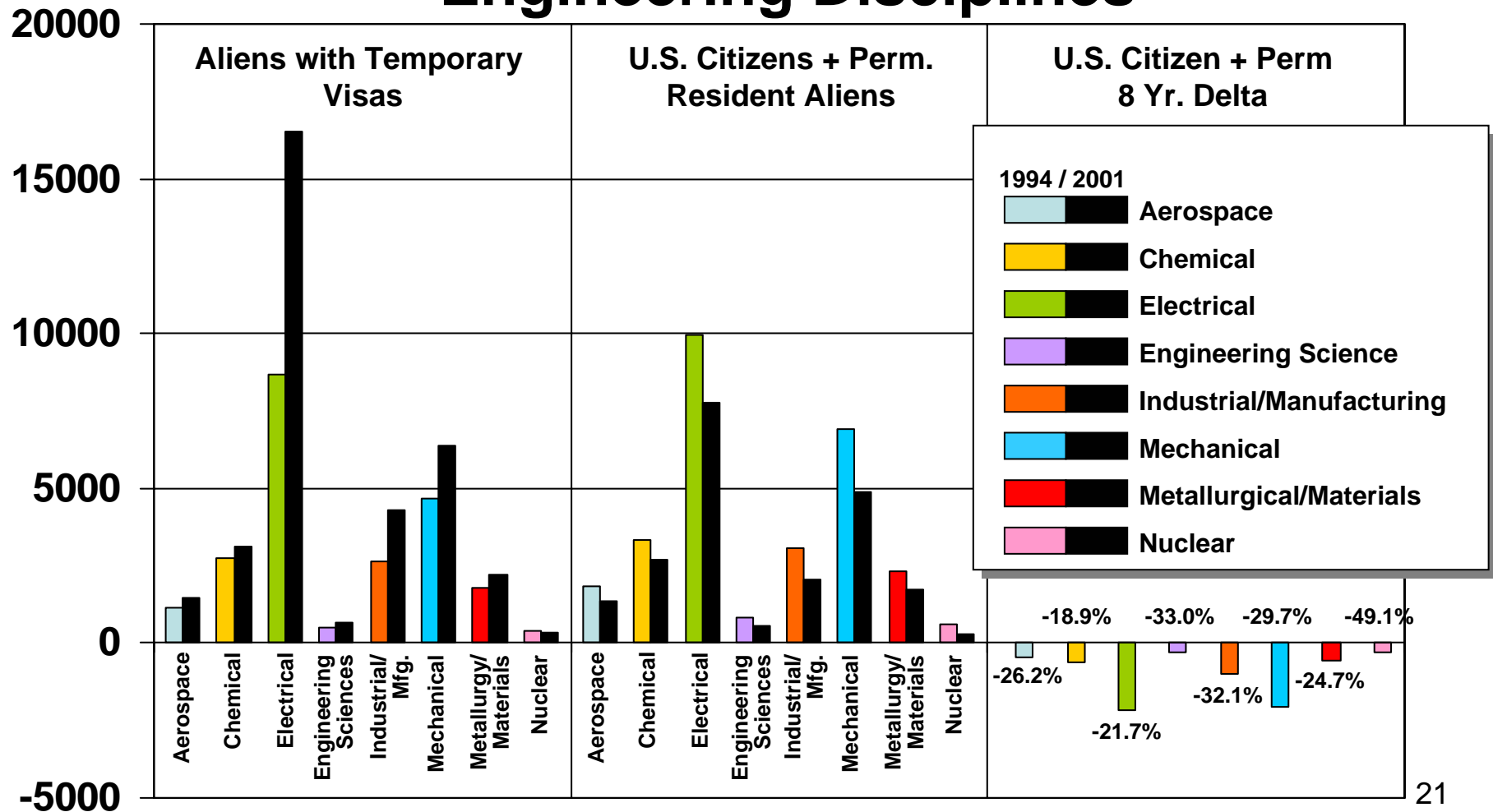


U.S. University Trends in Defense-Related S&E Graduate Student Enrollment (1994-2001)

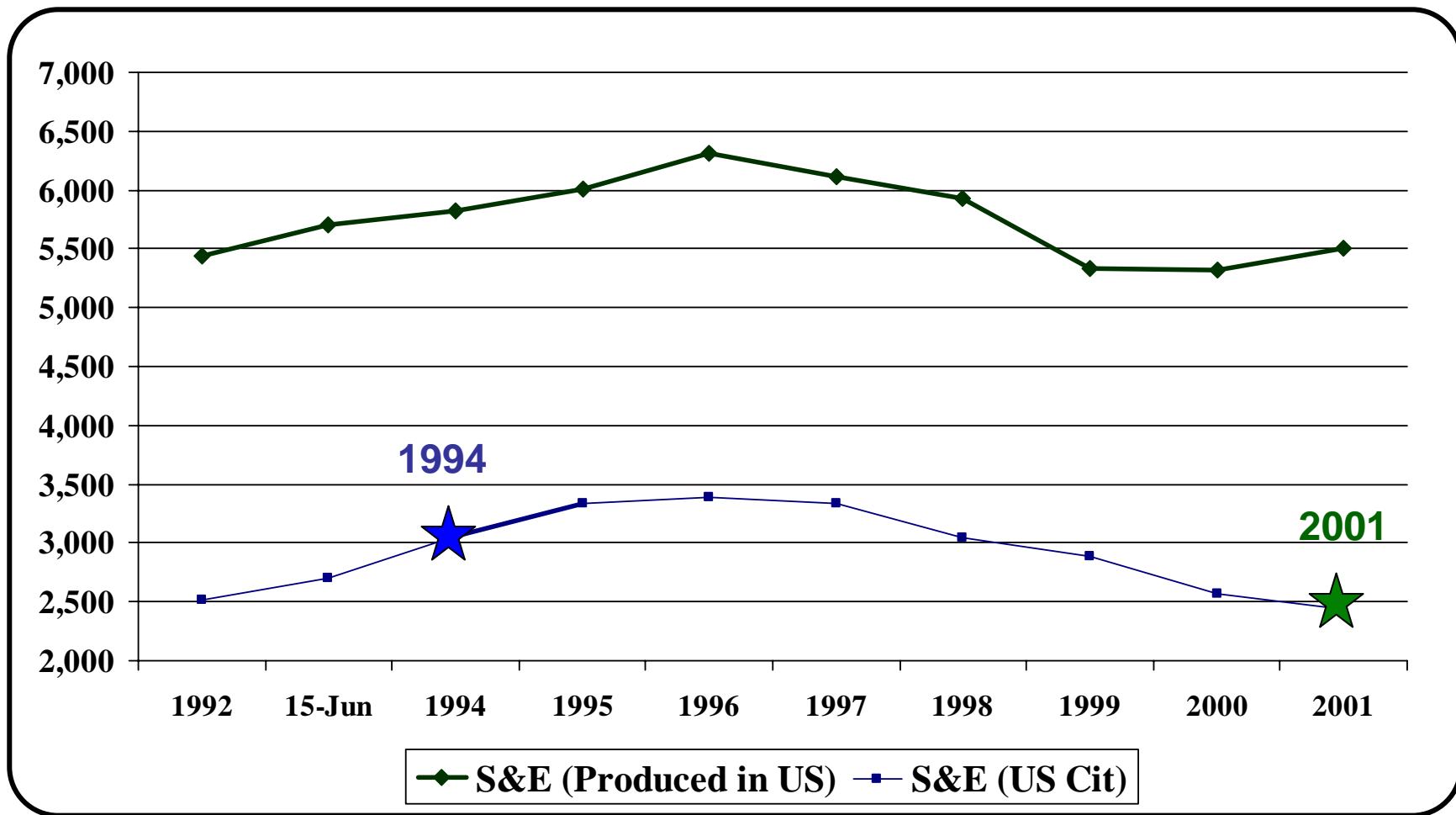


*Source: National Science Foundation – Graduate Students and Post Doctorates in Science and Engineering: Fall 2001

Engineering Disciplines



U.S. Engineering PhD's Awarded



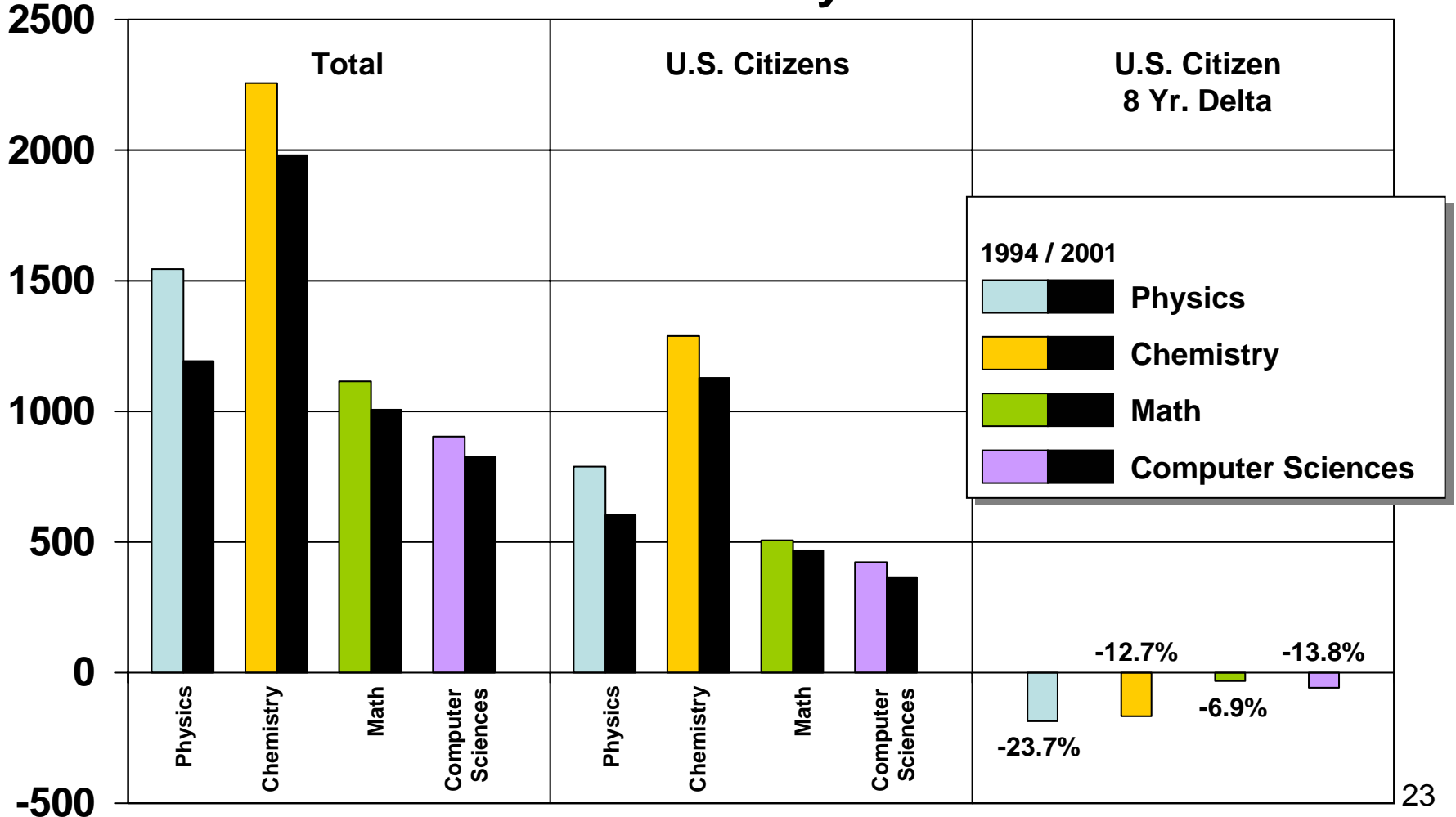
*Source: Data provided by the NSF, September 2002

U.S. S&E Ph.D. Production Trends (1994-2001)



*Source: National Science Foundation – Science and Engineering Doctorate Awards, 2002

Annual U.S. Defense-Related Physical Science Production

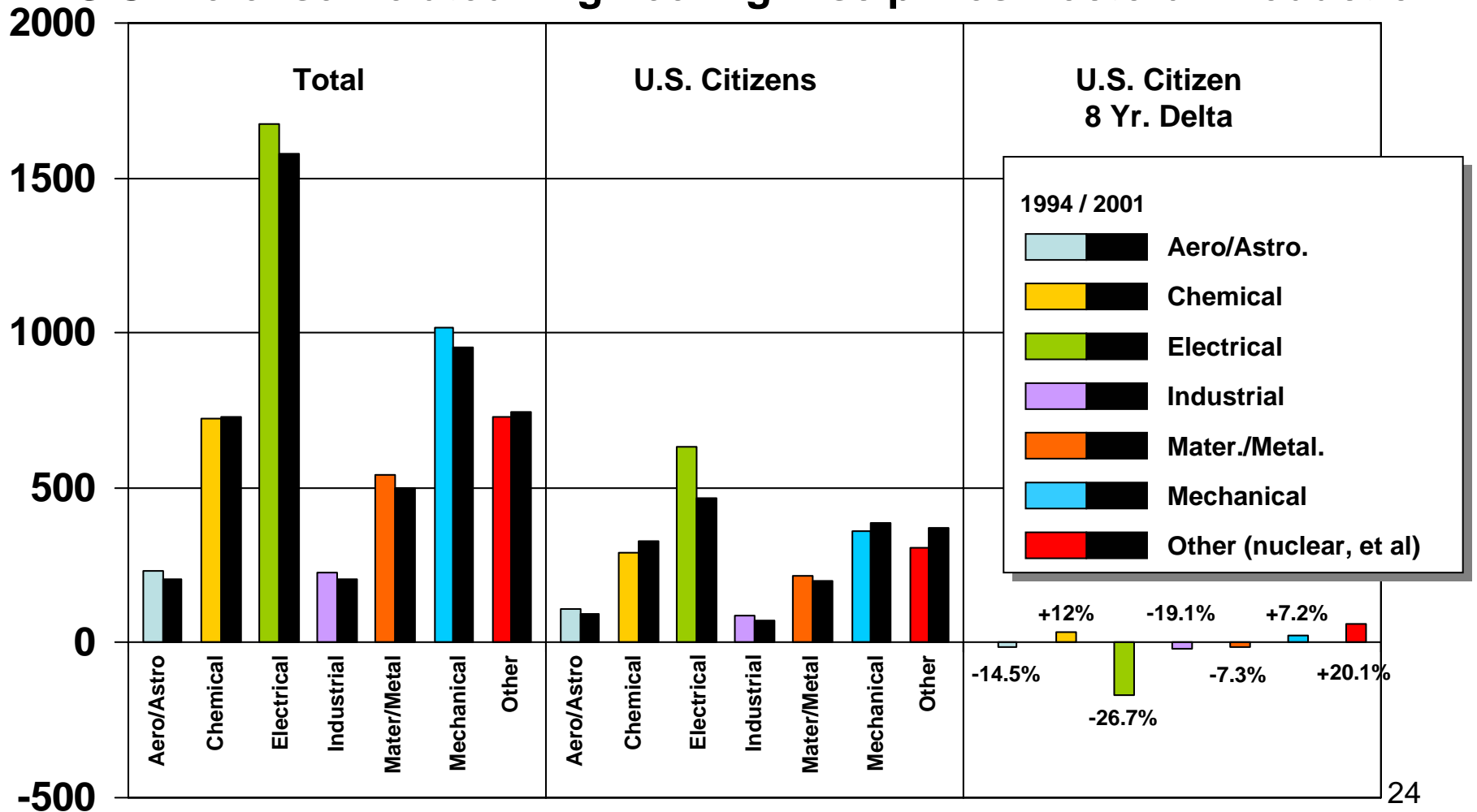


U.S. S&E Ph.D. Production Trends (1994-2001)



*Source: National Science Foundation – Science and Engineering Doctorate Awards, 2002

U.S. Defense-Related Engineering Disciplines Doctoral Production





Summary

- **There is an emerging Critical S&E Skills challenge anticipated within the DoD in the 5-10 year time frame based on several demographic indicators & high level studies**
- **DoD needs to ramp up its S&T workforce and research programs to meet critical skills shortfall and foreign challenges for that time frame**
- **Foreign language skills is a key program component**
- **Recommended solution: NDEA 2006 to help shape the 21st Century DoD workforce**